



NFTA *Niagara Frontier Transportation Authority*

Buffalo Niagara International Airport

SUSTAINABLE MASTER PLAN UPDATE

Executive Summary

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INTRODUCTION

Buffalo Niagara International Airport (BNIA) represents a gateway to Western New York State and portions of southeastern Ontario, Canada including Greater Buffalo and Niagara Falls. As such, BNIA is often the first impression that both tourists and business travelers have of the area and the last thing they see before boarding a plane home. The Airport is a well-planned and managed facility that offers a variety of passenger, cargo and general aviation services to the Greater Buffalo region.

Recognizing the importance of BNIA as a vital community asset, the Niagara Frontier Transportation Authority (NFTA), which oversees BNIA, commenced an update of the Airport Master Plan to address both short and long term growth. As many of the airside runway and taxiway projects outlined in the 2003 Master Plan Update have since been built, this analysis focused on enhancements to the terminal area facilities including parking, roadways as well as airport support facilities. Another key aspect of this Master Plan Update was the incorporation of sustainability into all phases of the planning effort as well as the development of new sustainability guidelines intended to reduce the overall energy and water consumption and environmental effects of the Airport on the surrounding environment.

This Executive Summary provides a discussion of key Master Planning tasks and outlines the proposed development that will address short term demand needs and projected long term growth. The following sections summarize key Master Planning efforts:

- Sustainability Initiatives
- Inventory of Existing Conditions
- Summary of Aviation Forecasts
- Proposed Airside Development
- Proposed Support Facility Development
- Proposed Terminal Enhancements
- Proposed Parking and Roadway Development
- Phased Development Schedule and Capital Improvement Program

SUSTAINABILITY INITIATIVES

Sustainability

Sustainability has become a major consideration for communities and states throughout the nation over the past several years. BNIA recognized the importance of sustainability and collaborated with the Federal Aviation Administration (FAA) to incorporate a sustainability element as part of this Master Plan. This is one of the first master plans in the FAA's Eastern Region to incorporate a sustainability element into the Master Planning process.

BNIA's vision of sustainable development is an outgrowth of the Airport's continued leadership as an environmental steward to the community. Therefore, the primary goal of the sustainability plan was to maximize the environmental quality and efficiency of all aspects of operations, but done within the current staff and budget constraints.

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For purposes of this effort, BNIA defined sustainability as follows:

- Insuring compliance with existing rules, laws & regulations
- Identifying strategies that exceed compliance, maximizing environmental quality & efficiency of all aspects of operations
- Programs must be revenue neutral or provide return on investment with source of initial capital investment identified
- Where programs are desirable, but not cost-effective, outside sources of revenue must be secured

These guiding principles formed the basis for developing the sustainability plan.

The next step was to identify sustainable opportunities and this was accomplished through a charrette process with various stakeholders. The Stakeholder Charrette brought together stakeholders including BNIA staff, airlines, tenants and surrounding town officials to discuss sustainable practices that are currently employed at the Airport and assess future practices that can be implemented to reduce BNIA's overall impact on the environment.

Four categories were initially identified by BNIA to focus sustainable development and were used to initiate the discussion. The four areas of focus were Building Efficiency, Exterior Air Quality, Waste Management and Recycling, and Water Use. Using this framework, a brainstorming session was conducted to identify the various opportunities under each of these categories. The brainstorming session generated a large number of opportunities and initiatives that could be implemented at BNIA. The list was reduced to a more manageable level by prioritizing projects that could be accomplished quickly, did not require large financial resources and could be accomplished within the current airport staffing levels. Based on these considerations, the following projects and initiatives were identified:

1. Building Efficiency Opportunities
 - a. Heating
 - b. Cooling
 - c. Reusing Hot Air
 - d. Lighting Sensors/Redundancy
 - e. Billing Procedures
 - f. Green Building Practices
2. Airfield Operations
 - a. Single Engine Taxi
 - b. Taxiway Expansion
 - c. Bio Fuels
3. Aircraft Ground Servicing
 - a. Electric Tugs
 - b. Gate Power Units
 - c. Preconditioned Air
4. Landside Vehicles
 - a. Trip Reduction
 - b. Cleaner Technology Vehicles and Incentives
 - c. Consolidate Shuttles
 - d. Light Rail

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- e. Improve Bus Service
- f. Parking Availability Signs
- 5. Waste Management/Recycling
 - a. Pay-as-you-Throw
 - b. Product Purchase Policies
 - c. Compost/Recycle Food Products
 - d. Integrated Program with Tenants
- 6. Water Use/Quality
 - a. Gray Water
 - b. Upgrade Bathroom Fixtures

BNIA will move forward and develop a sustainability plan and identify a phased approach to implement initiatives. The sustainability plan will also serve as a guide for developing a larger sustainability program within the NFTA.

Educational Outreach

As part of BNIA’s outreach program within the community, BNIA approached the Erie Community College Architectural Technology Program to collaborate on the sustainability element of the project. The collaboration effort entailed a presentation of the master planning process that described the process and analyses that comprise the study process and then a tour of the airport to familiarize the students with the daily operations of BNIA.



The students were then asked to research sustainability initiatives at airports and other industries and to present their findings as part of a sustainability charrette held a few weeks later. The Student Charrette was a great success; many of the concepts and options developed in the Stakeholder Charrette were reiterated by the students as well as other considerations, some of which will be adopted as part of BNIA’s future sustainability program. The charrette also provided the students with a “real world experience” that will benefit their future endeavors beyond college.

SUMMARY OF AVIATION FORECASTS

The forecast of aviation demand drives all other efforts in the Master Planning process including Demand Capacity and Facility Requirements. Since 2003, the Airport has seen a steady increase in commercial service activity and enplanements. This is due, in part, to the airside improvements that were made and the introduction of Low Cost Carriers (LCC) including Southwest and jetBlue that provide alternatives to legacy carriers and competitive fares.

Forecasts of aviation activity were developed for Commercial Service Passenger Enplanements and Operations, General Aviation, Air Cargo and Military activity. Various forecast methodologies were used to generate the aviation forecasts including Consensus Forecasting, Operations Per Based Aircraft, historical trends and judgment. The results of the forecasts of aviation demand are summarized in **Table E-1**.

Table E-1 Aviation Demand Forecast Summary

Aviation Demand Element	2015	2020	2030
Enplanements			
Airline	3,130,900	3,523,100	4,331,700
Mainline	2,201,500	2,448,400	2,937,700
Regional	929,400	1,074,700	1,394,000
Airline Peak Hour Enplanements	1,583	1,808	2,230
General Aviation	42,200	45,000	49,900
Aircraft Operations			
Airline	82,700	90,000	102,600
Mainline	41,400	45,600	52,800
Regional	41,300	44,400	49,800
Air Cargo	2,200	2,300	2,600
General Aviation*	55,100	56,300	59,900
GA Local	21,400	20,300	20,000
GA Itinerant*	33,700	36,000	39,900
Military	1,900	1,900	1,900
TOTAL AIRPORT	141,900	150,500	167,000

Source: RA Wiedemann; McFarland Johnson, 2010

* Itinerant general aviation operations differ from the FAA TAF due to non-airline air taxi operations being classified as itinerant general aviation operations in the context of this master plan.

The Consensus Enplanement and Operations forecasts were compared to the Federal Aviation Administration (FAA) Terminal Area Forecasts (TAF) to confirm they are reasonable. The resulting comparison showed that the Master Plan Update forecasts remain within specified tolerances for the out-year forecast by adjusting the TAF’s 2010 values with actual 2010 data for enplanements. With the adjustment and using the same growth rates, the enplanement forecasts fell within 9.5 percent in 2015 and to 11.49 percent by the year 2020, both of which are within FAA forecast deviation tolerances. The operations totals were also within reasonable ranges (10% within 5 years and 15% within 10 years) of the TAF.

In addition to the TAF comparison, a sensitivity analysis was also conducted related to Canadian passenger use. In 2009, Canadian passengers made up about 38% of passenger enplanements. Three scenarios were developed that addressed price differential between BNIA and Toronto and bridge access at the U.S. border. The resulting sensitivity forecasts showed that the high and low scenario results were within the range of forecasts developed under the consensus forecast.

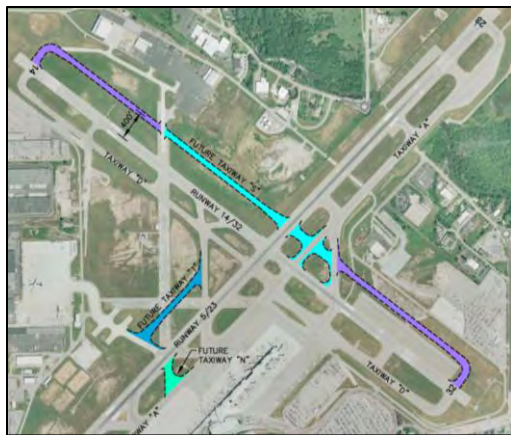
PROPOSED AIRSIDE DEVELOPMENT

Many airside runway recommendations made as part of the 2003 Master Plan Update were implemented during the mid 2000’s that significantly enhanced the Airport’s ability to accommodate commercial service traffic; the greatest benefit was the lengthening Runway 14-32, which provided operational flexibility and reduced the reliance of Runway 5-23.

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With those projects completed, this Master Plan Update focused on providing short and long term enhancements to airside operational efficiencies and addressing short term commercial aircraft parking needs. The recommended airside projects were as follows:

Category II Instrument Landing System – The proposed Category II (Cat II) system would decrease the current approach minimums from 200’ to 100’ ceiling and a Runway Visual Range (RVR) reduction from 1,800’ RVR to 1,600’/1,200’ RVR, thus allowing aircraft to operate during periods of poor visibility. Besides the improvement in lower minimums, two additional benefits were realized; the existing glide slope antenna is relocated out of the Runway Safety Area (meeting current FAA standards) and providing an additional 300’ of landing length due to the new location of the glide slope antenna.



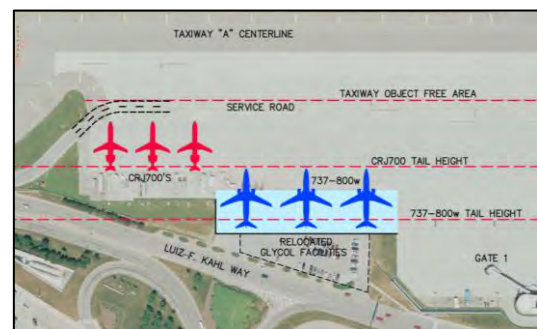
Taxiway Improvements – There are two proposed taxiway improvements proposed. The first is to incrementally construct a full parallel taxiway on the east side of Runway 14-32. This taxiway enhances access to/from the General Aviation area to either end of the runway and eliminates the number of Runway 14-32 crossings required when accessing Runway 32 or 23.

The other proposed taxiway enhancement is to add a partial parallel taxiway to the Northwest side of Runway 05-23. This partial parallel taxiway allows the segregation of General Aviation aircraft from

Commercial aircraft on Taxiway A when accessing the Runway 05 end and speeds access to and from the Air Cargo Apron.

The overall enhancement to the operational movements of aircraft and reduction of runway crossings significantly improves safety and reduces environmental effects through a reduction in aircraft taxi times.

Remain Overnight (RON) Aircraft Parking – As commercial airlines have increased their schedules over time, the Airport has experienced an increase in the need to park overnight aircraft in other areas. The Airport constructed seven RON hardstand positions along Taxiway K-1; however, up to six additional spaces are required over the short to mid-term. A location at the western end of the Terminal Apron was identified to accommodate up to six aircraft parking positions. Glycol tanks located in this area can be relocated into a parking lot immediately behind the new RON area that will no longer be used.



PROPOSED SUPPORT FACILITY DEVELOPMENT

There are a number of support facilities that serve the Airport. Most of these facilities meet facility requirement needs. For purposes of this assessment, proposed development shown for all but Airfield Maintenance and the Airport Rescue and Fire Fighting Facility (ARFF) incorporated development intended to reserve space should additional demand occur during the 20 year forecast period. The proposed support facility development is summarized below.

Airport Rescue and Fire Fighting Facility – The existing ARFF facility is located on the western portion of the Airport, immediately adjacent to the Air Cargo Apron. The facility was built in the early 1970’s and has been modified over time to accommodate larger staff and vehicles. The current facility is old, with inadequate office and personnel space, no drive through vehicle bays and vehicle bays that cannot meet future vehicle needs.



Several sites were evaluated, including the existing site. The ultimate site selected was a new site on the southeasterly side of Runway 14-32, adjacent to Mercy Flight’s facility. The new location meets all facility requirements in terms of space and equipment and provides improved staging for emergencies, adequate access to all runway ends and a slightly reducing response time to the terminal, which represents the bulk of calls. The new facility will also incorporate several sustainability elements including the orientation of the facility to maximize sun exposure and energy savings through new building materials.



Airfield Maintenance Facility – The existing maintenance facility is comprised of several buildings located in the southwesterly quadrant of the Airport. A number of the buildings are old and nearing their useful life. For example, the existing vehicle maintenance facility is old, outdated, and not sized properly for the amount of equipment owned and used for airfield facility maintenance. During the summer, much of the snow removal equipment is stored outside, which ultimately shortens the life of the equipment.

As with the ARFF facility, several new sites and the existing site were evaluated. It was concluded that relocating and building a new facility would be the most cost effective approach. The new location is in the northeast quadrant of the Airport just north of the Runway 5-23 intersection. The new facility meets existing and future needs and the former location can be converted to non-aviation revenue producing development, further enhancing the Airport’s revenue stream. Similar to the new ARFF facility, the new building will incorporate energy savings through new construction and the incorporation of energy saving elements.

Air Cargo Facility – The existing air cargo area, located on the westerly side of the Airport, is adequately sized to meet existing and future needs. The area is currently used by two small package carriers and there is adequate apron area for additional aircraft parking associated with peak period operations.



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For purposes of this Master Plan, additional area was identified for future apron and facility development given that the air cargo industry could change, thus placing new demand at the Airport in the mid to long term planning period. As there is adequate airside area available, space for a new cargo sorting facility was identified as well as additional apron area.



General Aviation – The General Aviation area is located in the northeast quadrant of the Airport and is comprised of several aprons and large hangar facilities. The current size and facilities associated with the General Aviation area meet current and future demand needs. The existing Fixed Based Operator plans to add an additional large corporate hangar adjacent to an existing hangar in several years.

As with the Air Cargo area, additional area for hangars and associated aprons was reserved to accommodate unforeseen expansion needs over the mid and long term. This will provide flexibility should the demand be realized.

Fuel Farm – The existing fuel farm is comprised of four large fuel tanks to store several days' worth of aviation fuel. As with the Air Cargo and General Aviation areas, area was reserved for the addition of several tanks should future demand dictate additional storage capacity. The additional area is immediately south of the existing storage tanks.



PROPOSED TERMINAL ENHANCEMENTS

The facility requirements analysis indicated that the existing terminal meets the 20-year forecast demand for gates and most space needs. The analysis indicated that the 24 gate facility has adequate space to accommodate future passenger and baggage demand. One of the areas needing improvement, focused around enhancing facilities to address inbound baggage hall congestion issues on the lower level. On the upper level, the considerations focused on space allocation in the long term related to Transportation Security Administration (TSA) security lanes, ticket hall congestion, relocation of Airport Administration space, and improvements to vertical movement and passenger flow to the lower level. The specific actions are summarized as follows:

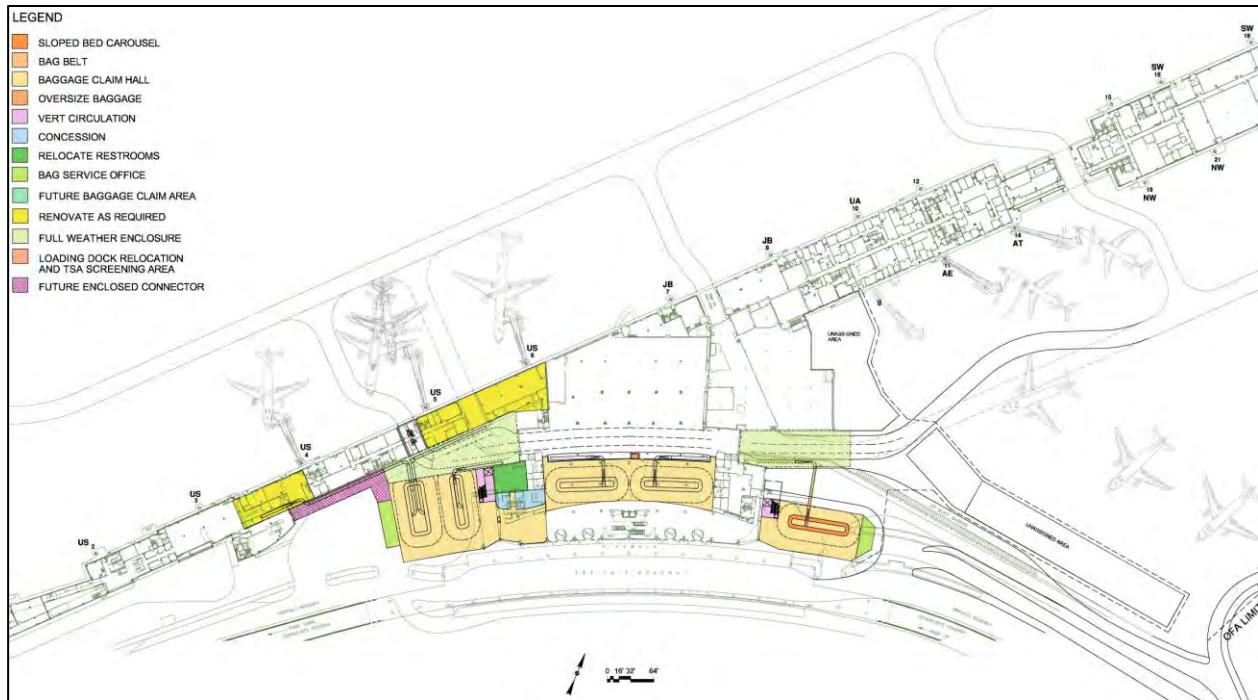
Proposed Development Lower Level

The recommended long term development plan for the terminal lower level is shown in the graphic below. To address the lower level baggage claim issues, several actions are proposed. In the short term, relocation of controls will alleviate some of the congestion that currently occurs.

To address the baggage hall needs, the recommended option is a phased replacement of the flat plate carousels with new slope plate carousels. The hall would be expanded to the west and the airline baggage offices relocated to the west to accommodate two new slope plate devices that replace the existing flat plate carousels. To ensure seamless operations, a new slope plate carousel will be built in the expansion area and made operational prior to work beginning to replace the flat plate devices.

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Future baggage capacity is provided by an additional carousel that can be built in the west expansion of the baggage hall (which could also be used for international operations). In the long term, a fifth slope plate carousel can be added on the easterly side of the baggage hall. This carousel would correspond with long term development on the second level, which is described in the next section.

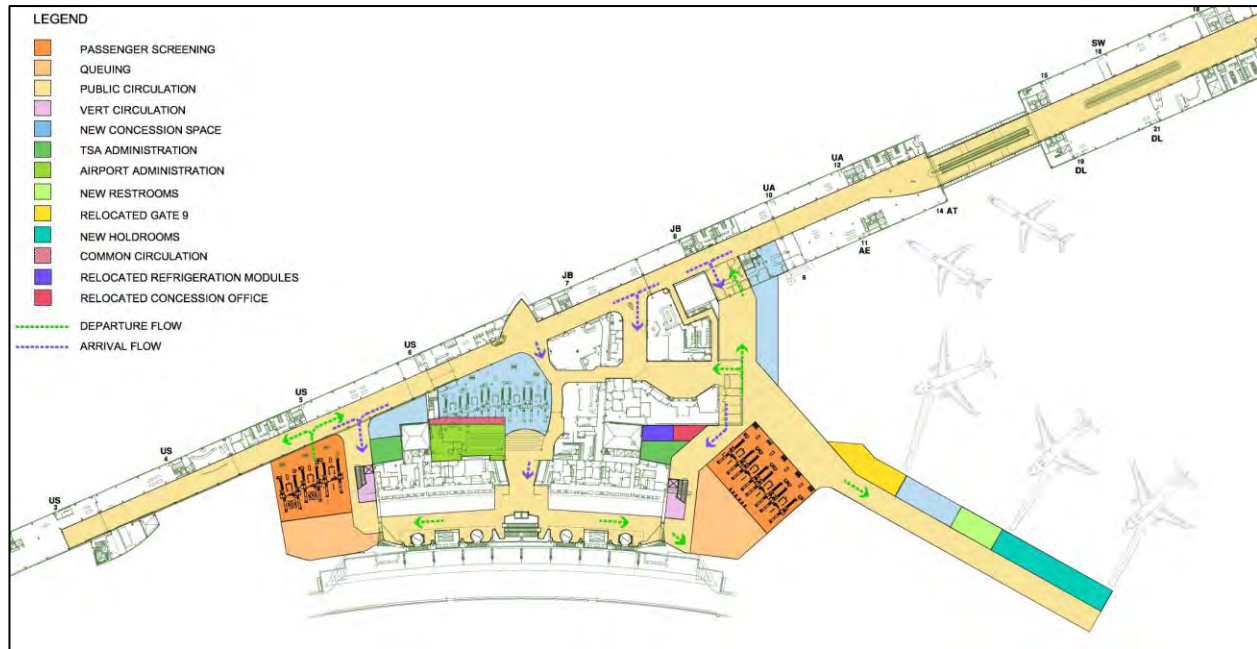


Proposed Development – Upper Level

Upper level development focuses on better flow of passengers to the lower level, long term TSA security lane needs and ticketing hall expansion to alleviate congestion currently experienced during peak periods. Use of check-in kiosks and self-tag baggage will change the way in which the current ticketing hall is used. In the mid to long term future, facility changes associated with the baggage hall expansion can be used to restructure the current TSA security screening area and allow two security checkpoints that cater to the easterly and westerly airline ticket counters. Also, airline office area reduction over time will allow for the relocation of the Airport Administrative Offices.

In the long term, the remaining central security screening area can be relocated to an easterly facility expansion, thus providing two independent security screening areas for the two airline ticketing areas. By relocating the central screening area, new space is available to expand concessions, thereby adding new services for passengers and enhancing revenue production for the Airport.

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The proposed layout is also flexible should additional aircraft gates be required, a new three gate pier can be added on the southeast side of the terminal. The graphic below highlights the overall proposed changes including the consideration for a three gate expansion.

PROPOSED PARKING AND ROADWAY DEVELOPMENT

The proposed development for the inner circulation roadways and parking area focused on alleviating roadway congestion, providing additional covered parking, expanding on-airport rental car facilities and enhancing the overall customer experience. The proposed development is shown on the next page. A copy of the final Airport Layout Plan that shows the proposed 20 year development is provided at the end of this Executive Summary.

Several roadway/parking garage options were assessed to identify the best balance between internal circulation roadway improvements, passenger parking demands and rental car requirements. The major focus of the internal roadway was to revamp the roadway to decrease the number of decision points, minimize merge and converging traffic areas, and improve inner loop circulation.

The two existing entrances off Genesee St are maintained. The major changes occur on the west end of the roadway system where the use of a new access flyover from the Kensington Expressway is built to reduce congestion coming into the Airport. The west exit is also widened to provide dedicated east and west turn lanes onto Genesee St and two through lanes accessing the Kensington Expressway. The widening of the roadway eliminates the congestion experienced during peak periods. Other west roadway modifications enhance the merge lanes by providing the necessary lengths to merge traffic gradually as opposed to the short distances currently provided. A partial roundabout is also incorporated to reduce vehicle speeds at a key decision point as vehicles depart the terminal and the parking garage.

The proposed 4,000 space parking garage accommodates the projected need for an additional 3,200 parking spaces. The garage will provide covered parking that will benefit passengers who

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must now park in surface lots. This is a significant enhancement in customer service, especially during the winter months. The garage would be adjacent to the existing three level garage, which would be facilitate additional rental car spaces and continue to serve as short term parking (upper level only).

As part of a phasing plan, a 1,200 space parking lot would be added to the existing long term remote lot on the easterly side of Runway 32. Once this lot becomes active, modifications to the parking and roadway system can start without affecting parking.

PHASED DEVELOPMENT SCHEDULE AND CAPITAL IMPROVEMENT PROGRAM

The proposed projects will be phased in over the next 20 years. The plan is phased in three terms, Phase I, Phase II and Phase III as shown in **Table E-2**.

Table E-2 Phased Capital Improvement Program

Phase I Projects (2011-2014)	
1.	Noise Compatibility Program (continuation and closeout of the noise program)
2.	Property Acquisition and Building Removal (Wetzel Parcel)
3.	Design/Construction of Terminal Restroom Improvements
4.	Design/Construction of a Salt Storage Barn
5.	Design/Construction of West Side Water Main Replacement
6.	Design/Construction of a Compressed Natural Gas (CNG) Fueling Facility
7.	Design and Initial Construction of Terminal Level 1 Baggage Claim Improvements
8.	Design of New ARFF Facility
9.	Section 512 Solar Panel Project
10.	Design/Construction of FBO Hangar and Apron Project (Private Development)
11.	Design/Construction of East Side Remain Over Night Aircraft Parking Along Taxilane K1
Phase II Projects (2015-2019)	
1.	Environmental Assessment For Next 5 Year Capital Improvement Program
2.	Design/Construction of Remain Over Night aircraft Parking - West Side
3.	Construction of New ARFF Facility
4.	Design/Construction of Terminal Roadway Improvements
5.	Design/Construction of New Snow Removal Equipment Storage Building
6.	Design/Construction of Level 1 and 2 Baggage Claim Expansion
7.	Design/Construction of Taxiway S Between TW Q and TW A - East Side of Runway 14/32
8.	Design/Construction of Taxiway T (North of RW 14/32) and Taxiway N
9.	Design of 4,000 Space Parking Garage
10.	Design/Construction of Expansion of Engineered Wetlands
11.	Design of Category II Instrument Landing System Approach Improvements
Phase III Projects (2020-2030)	
1.	Construction of Category II Instrument Landing System Approach Improvements
2.	Construction of Parking Garage – 4,000 spaces
3.	Design/Construction of Level 2 Mid Term Terminal Enhancements
4.	Design/Construction of Level 2 Holdroom Expansion
5.	Design/Construction of Taxiway S Between TW Q and RW 14 and TW A and RW 32
6.	Design/Construction of Air Cargo Apron Expansion (Private Development)
7.	Design/Construction of General Aviation Expansion (Private Development)
8.	Design/Construction of Level 2 Long Term Terminal Enhancements

Source: NFTA and McFarland Johnson.

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Phase I projects are a mix of planned capital projects with an initial set of Master Plan projects. Major Master Plan projects include the initial RON development, expansion of the long term lot, and the design of the new ARFF facility.

Phase II focuses on taxiway improvements, construction of the ARFF building and new Maintenance Facility, lower level baggage handling improvements and roadway and parking garage improvements.

Phase III projects are out year projects that may be built based on long term demand. These projects focus on capacity enhancements including the CAT II Instrument Landing System, long term taxiway improvements and terminal facility improvements.

The cost of projects is funded through a number of financial resources provided by the Federal Aviation Administration, NFTA, the State of New York and private funding. Many of the projects are eligible for FAA funding; 75% to 90% of the project cost is covered through Entitlement Grants, or Discretionary Grants. In most cases, the remaining portion is covered equally by the State of New York Funding and the NFTA while in other cases; the remaining portion may be funded by the NFTA. There are several projects that are not eligible for FAA funding; therefore those projects will be funded through NFTA or by third party sources. Money collected through the Passenger Facility Charge (PFC) program can be used to cover the NFTA share for most projects on the CIP. **Table E-3** summarizes the cost breakdown for each phase.

Table E-3 Capital Improvement Program

Time Frame	Total Cost	FAA	State	NFTA	Other
Short Term (2011-2014)	\$31,817,298	\$20,081,296	\$2,743,001	\$2,743,001	\$6,250,000
Mid Term (2015-2019)	\$108,087,510	\$73,565,633	\$12,260,939	\$12,260,939	\$10,000,000
Long Term (2020-2030)	\$217,126,500	\$77,344,875	\$12,890,813	\$12,890,813	\$114,000,000
Total Planning Period	\$357,031,308	\$170,991,804	\$27,894,752	\$27,894,752	\$130,250,000

Source: NFTA and McFarland Johnson.

